Reitstötter, Kinzebach & Partner (GbR)

Patentanwälte

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Reitstötter, Kinzebach & Partner
Postfach 86 06 49, D-81633 München

DE NORA TECNOLOGIE ELETTROCHIMICHE S.r.l.
Patent & Licensing Department
Attn.: Dr. Enrico Ramunni
Via Bistolfi, 35
20134 Milano
ITALIEN

Dr. Werner Kinzebach
Dr. Peter Riedl
Dr. Georg Schweiger
Dr. J. Uwe Müller
Dr. Wolfgang Thalhammer
Dr. Michael Pohl
Dr. Thomas Wolter
Andreas Rabe
Dr. Jens Wortmann
Katja Kinzebach (Rechtsanwältin)
Dr. Andreea Schuster-Haberhauer
Prof. Dr. Dr. Reitstötter (1982)

Zugelassene Vertreter beim
Europäischen Patentamt
European Patent Attorneys
Telefon: +49(0)89 99 83 97 - 0
Telefax: +49(0)89 98 73 04
Sternwartstr. 4, D-81679 München
email: office@kinzebach.de

Munich, 17.10.2005

Our Ref.: M/45198-PCT

Re.: **International Patent Application PCT/EP2004/008397**
De Nora Elettrodi S.p.A.
Your Ref.: 223

Dear Dr. Ramunni:

We refer to your e-mail message of September 28, 2005 and confirm that we have filed a response to the second written opinion. Please refer to the enclosure for details.

We shall keep you promptly advise of any developments in this matter.

Very truly yours,

(Wolfgang Thalhammer)

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Encl.:
Submission to the EPO of October 10, 2005
Debit note (by mail only)

Reitstötter, Kinzebach & Partner (GbR)

Patentanwälte

Dr. Werner Kinzebach
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Dr. Georg Schweiger
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Zugelassene Vertreter beim
Europäischen Patentamt
European Patent Attorneys
Telefon: +49(0)89 99 83 97 - 0
Telefax: +49(0)89 98 73 04
Sternwartstr. 4, D-81679 München
email: office@kinzebach.de

Reitstötter, Kinzebach & Partner
Postfach 86 06 49, D-81633 München

European Patent Office

80298 München

Munich, 10.10.2005

Our Ref.: M/45198-PCT

Re.: **International Patent Application PCT/EP2004/008397**
De Nora Elettrodi S.p.A.

Further to the second written opinion of July 26, 2005:

Enclosed herewith are new claims 1 to 22 which should form the basis for further examination.

The subject matter of former claims 2 and 3 has been incorporated into claim 1. Likewise, the subject matter of claim 23 has been incorporated into independent claim 22 (new claim 20).

It is noted that novelty and inventive step have already been acknowledged for former claims 2 or 3, respectively, as well as for former claim 23.

Having regard to the claims directed to an anode (claims 11 to 13), applicants maintain their position that an anode prepared by the method of claim 1 is different from and, hence, novel over the electrodes known from D2. Reference is made to the discussion at page 4, lines 15 to 19 of the description. The enhancement of the stability and of the electrocatalytic activity of the coatings is unexpected, and clearly related to the the composition and/or inner structure thereof.

(Wolfgang Thalhammer)

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Encl.
New claims 1 to 22

CLAIMS:

1. A method for the manufacturing of an electrode, comprising the application of a solution of a precursor for the pyrolytic formation of a tin-containing coating to a substrate of a valve metal, followed by the execution of thermal treatment, wherein the precursor solution comprises a stannic hydroxychloride species selected from a non-stoichiometric compound expressed by the formula $Sn(OH)_{2+x}Cl_{2-x}.nH_2O$, and a compound expressed by the formula $SnO(H_2O)_nR_{2-x}Cl_x$, wherein R is an organic substituent.

2. The method of claim 1 wherein the Cl:Sn molar ratio is comprised between 1 and 1.9.

3. The method of claim 1 or 2 wherein R is the acetic group (CH_3COO-)

4. The method of any one of the previous claims further comprising a precursor of at least one noble metal.

5. The method of claim 4 wherein said precursor of at least one noble metal is a chlorinated precursor of iridium or ruthenium.

6. The method of claim 5 wherein said chlorinated precursor of iridium is H_2IrCl_6.

7. The method of anyone of claims 1 to 6 wherein a valve metal is titanium or titanium alloy optionally provided with a ceramic pre-layer.

8. The method of claim 7 wherein the ceramic pre-layer comprises titanium dioxide.

9. The method of anyone of claims 1 to 8 wherein said application of the solution is effected in multiple coats, each followed by a thermal treatment.

10. The method of anyone of claims 1 to 9 wherein said thermal treatment is a pyrolysis at a temperature comprised between 350 and 800°C, optionally preceded by a drying at a temperature comprised between 80 and 200°C.

11. An anode provided with an electrocatalytic coating comprising tin, preferably tetravalent and in form of mixed oxide, prepared by the method of any one of the previous claims.

12. The anode of claim 11, prepared by the method of claim 4, wherein said coating has electrocatalytic properties toward the chlorine evolution reaction and said at least one noble metal is ruthenium.

13. The anode of claim 12, prepared by the method of claim 4, wherein said coating has electrocatalytic properties toward the oxygen evolution reaction and said at least one noble metal is iridium.

14. A solution of a precursor for the pyrolytic formation of a tin-containing coating, comprising a stannic hydroxychloride species selected from a non-stoichiometric compound expressed by the formula $Sn(OH)_{2+x}Cl_{2-x}.nH_20$ and a compound expressed by the formula $SnO(H_2O)n\ R_{2-x}Cl_x$, wherein R is an organic substituent.

15. The solution of claim 14 wherein the Cl:Sn molar ratio is comprised between 1 and 1.9.

16. The solution of claim 14 or 15 wherein R is the acetic group.

17. The solution of any one of claim 14 to 16 further comprising a precursor of at least one noble metal.

18. The solution of claim 17 wherein said precursor of at least one noble metal is a chlorinated pre-cursor of iridium or ruthenium.

19. The solution of claim 18 wherein said chlorinated precursor of iridium is

H_2IrCl_6.

20. A method for the manufacturing of a precursor solution for the pyrolytic formation of a tin-containing coating comprising the addition of hydrogen peroxide to a stannous chloride solution, optionally under temperature and redox potential control., wherein the Cl:Sn ratio in the solution is decreased by subsequent reduction of metallic tin and further addition of hydrogen peroxide, optionally under temperature and redox potential control.

21. The method of claim 20 wherein said stannous chloride solution further contains a precursor of an organic substituent.

22. The method of claim 21 wherein said precursor of an organic substituent is acetic acid.